Attachment 2

Upper Santa Margarita Watershed Region

IRWM Implementation Grant Proposal

Project Justification

Attachment 2 consists of the following items:

Project Justification. Attachment 2 provides a project description, estimated physical benefits, technical justification, a description of how claimed benefits can be achieved, least cost alternative information for each project, and monitoring plan infomation.

The *Upper Santa Margarita Watershed Proposition 84, 2015 Solicitation Grant Proposal* involves implementation of four projects to meet the Upper Santa Margarita Watershed IRWM Region's water management needs:

1. Wellhead Treatment Facilities – Well 102 Project
2. Water Use Efficiency Turf Removal Project
3. Expanded Recycled Water & Plant Material Conversion Project
4. Riverside County Parks Turf Reduction Program

For each of the proposed projects, Attachment 2 contains a detailed project description, estimated physical benefits, technical justification, a description of how claimed benefits can be achieved, least cost alternative information and monitoring plan information organized into the table format provided in the Proposal Solicitation Package (PSP). This attachment is organized to first provide the project summary table, the 25-word project descriptions and the regional project map, then provides the project information listed above.

Projects Summary Table

The following table (Table 4 in the PSP) provides information on how each proposed project meets IRWM project elements. Each proposed project meets at least one item in each of these categories.

	Project	1	2	3	4
	IRWM Project Element	Wellhead Treatment Facilities – Well 102 Project	Water Use Efficiency Turf Removal Project	Expanded Recycled Water & Plant Material Conversion Project	Riverside County Parks Turf Reduction Program
IR.1	Water supply reliability, water conservation, and water use efficiency	X	X	X	X
IR.2	Stormwater capture, storage, clean-up, treatment, and management				
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands				X
IR.4	Non-point source pollution reduction, management, and monitoring		X	X	X
IR.5	Groundwater recharge and management projects	X			
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users				
IR.7	Water banking, exchange, reclamation, and improvement of water quality				
IR.8	Planning and implementation of multipurpose flood management programs				
IR.9	Watershed protection and management		X	X	X
IR.10	Drinking water treatment and distribution	X			
IR.11	Ecosystem and fisheries restoration and protection				

Brief Project Descriptions

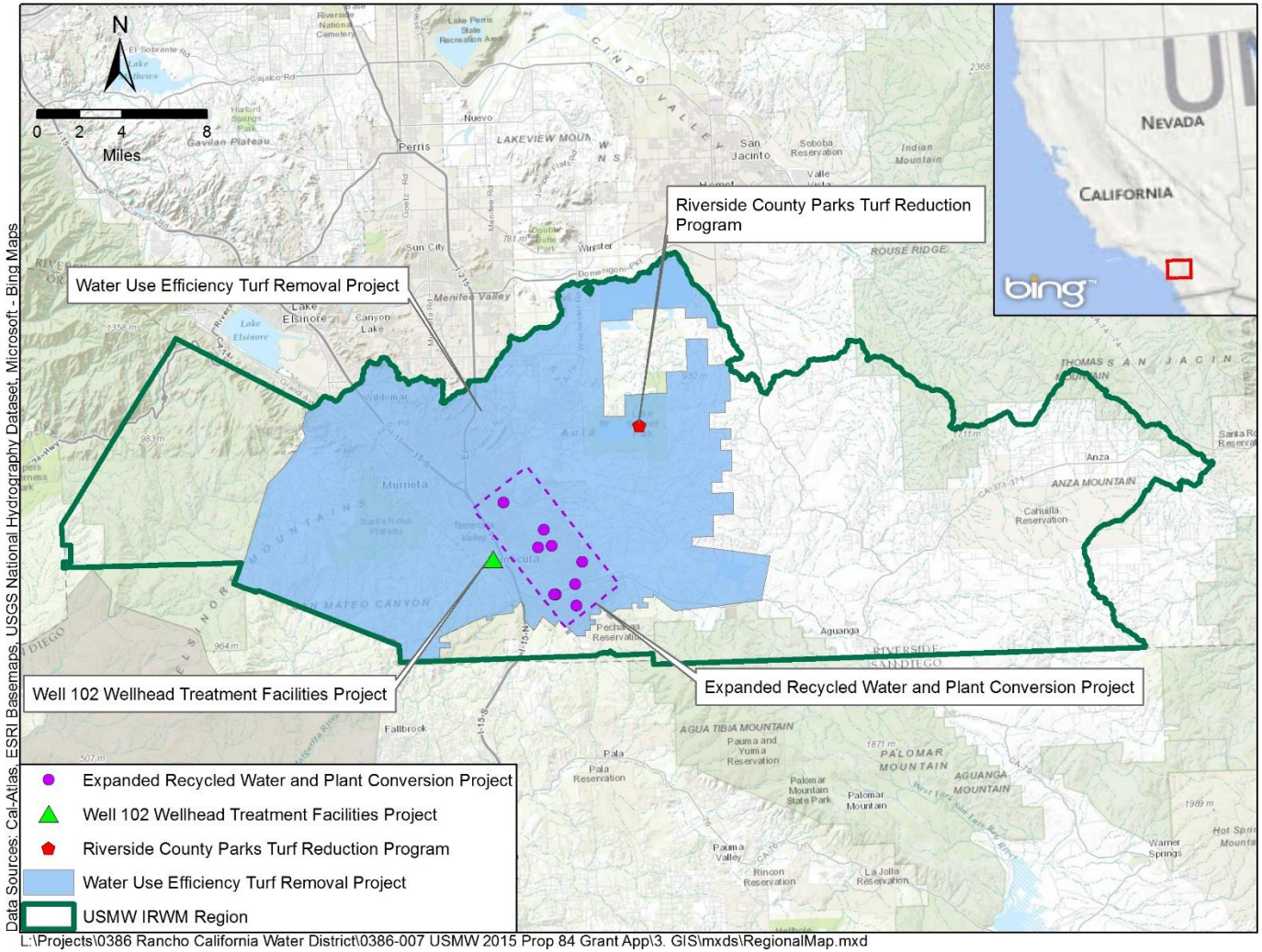
The following table briefly describes the four projects included in this proposal.

Project	Description (25 word limit based on PSP)
Wellhead Treatment Facilities Project – Well 102 Project	This Project will renovate RCWD's existing Well 102 to improve water quality and increase water supply for the hydrologic region.
Water Use Efficiency Turf Removal Project	This Project will provide rebates for the replacement of turf with water efficient landscaping throughout EMWD's service area in the Upper Santa Margarita IRWM Region.
Expanded Recycled Water and Plant Conversion Project	This Project will reduce imported potable water demand through increased recycled water use, while decreasing energy consumption and implementing a public education element.
Riverside County Parks Turf Reduction Program	This Project will reduce water demand and urban runoff through replacement of turfgrass with drought tolerant plants and improved irrigation system efficiency.

Regional Map

Figure 2-1 provides a regional map that shows the Upper Santa Margarita Watershed IRWM Region boundaries and the project locations.

Figure 2-1: Regional Map



Expanded Project Descriptions

Wellhead Treatment Facilities – Well 102 Project

The Rancho California Water District (RCWD) Wellhead Treatment Facilities – Well 102 Project (Project) will provide a reliable, high quality drinking water source for the RCWD service area by adding wellhead treatment in the form of oxidation- filtration for iron and manganese removal to its Well 102 to allow it to provide water suitable for RCWD's potable water system. Well 102 is located in RCWD's South Murrieta Hydrologic Unit (HU) within the Temecula Valley Groundwater Basin (Basin), which has capacity to produce up to 1,500 AFY of groundwater, although 1,000 AFY is considered the safe yield of the HU. The South Murrieta HU has consistently produced water that has high concentrations of Iron and Manganese, typically exceeding the California Department of Public Health (CDPH) secondary maximum contaminant limit (sMCL).

RCWD operates three wells in the South Murrieta HU (Wells 101, 102 and 118). Wells 101 and 118 currently supply RCWD's potable water system, and Well 102 supplies the recycled water system at a rate of less than 50 AFY. RCWD has struggled to maintain production in all three wells due to the water quality issues, namely iron and manganese. In addition, the well casing of Wells 101 and 118 are deteriorating, reducing reliability of supply pumped from these wells. In recent years, CDPH mandated treatment for these existing production wells to meet drinking water standards or abandon the use of the wells, which would reduce the water supply by 1,000 AFY, resulting in an increased dependence on imported supply.

This Project will add wellhead treatment to Well 102 to allow it to provide water supply to the potable water system (instead of to the recycled water system), while Wells 101 and 118 are maintained but operated for reserve capacity only. The major physical components of the Project include the following:

- Well pump and motor replacement providing 250 horsepower capacity
- 200 lb/day capacity on-site Sodium Hypochlorite (NaOCl) generation and feed system for oxidation and disinfection of potable water.
- Three (3) ASME rated greensand or proprietary media pressure filters (2 duty, 1 standby) for removal of iron (Fe) and manganese (Mn).
- 106,000 gallon capacity bolted steel backwash settling tank with supernatant return system.
- Associated piping, valves, electrical, instrumentation and site improvements for a fully operational facility.
- Extension and connection of Well 102 discharge piping to the existing potable water distribution system.

The anticipated physical benefits of the Project are production of approximately 1,000 AFY of high quality, reliable local supply water and improved water quality through removal of 0.34 mg/L of manganese and 0.15 mg/L of iron. RCWD manages the Basin closely to avoid overdraft and therefore anticipates a pumping maximum of 1,000 AFY. Well 102 treatment facilities would ensure continued production from the South Murrieta HU and will clean up a groundwater source that currently exceeds the CDPH sMCL for manganese and iron.

The intended outcome of the Project is to create a new sustainable source of supply for the service area through optimized management of the South Murrieta HU. RCWD's current groundwater management practices will ensure responsible operation of the Basin providing supply benefits for the life of the new wellhead and treatment equipment, which is expected to be approximately 25 years. In addition, the removal of iron and manganese will improve water quality issues for the hydrologic zone.

The Project will address the current needs of the Region by maintaining the ability to pump groundwater and reducing imported water reliance. The Project will support the following objectives of the USMW IRWM Plan: increase local supply development, improve quality and ability to access and increase groundwater supply, and adapt to and mitigate against climate change by promoting adaptation strategies and reducing water related greenhouse gas emissions.

Project Map

Figure 2-2 provides a project map that shows the Well 102 project location in reference to affected water resources (Temecula Valley Basin and specifically the South Murrieta HU) and the benefit area (Rancho California Water District Service area). Figure 2-3 shows the detailed location of Well 102; the well is located at this point, and will be connected to the potable water system. Monitoring of water supply and quality will take place at this point location.

Figure 2-2: Well 102 Wellhead Treatment Facility Project Location with Water Resources and Benefit Area

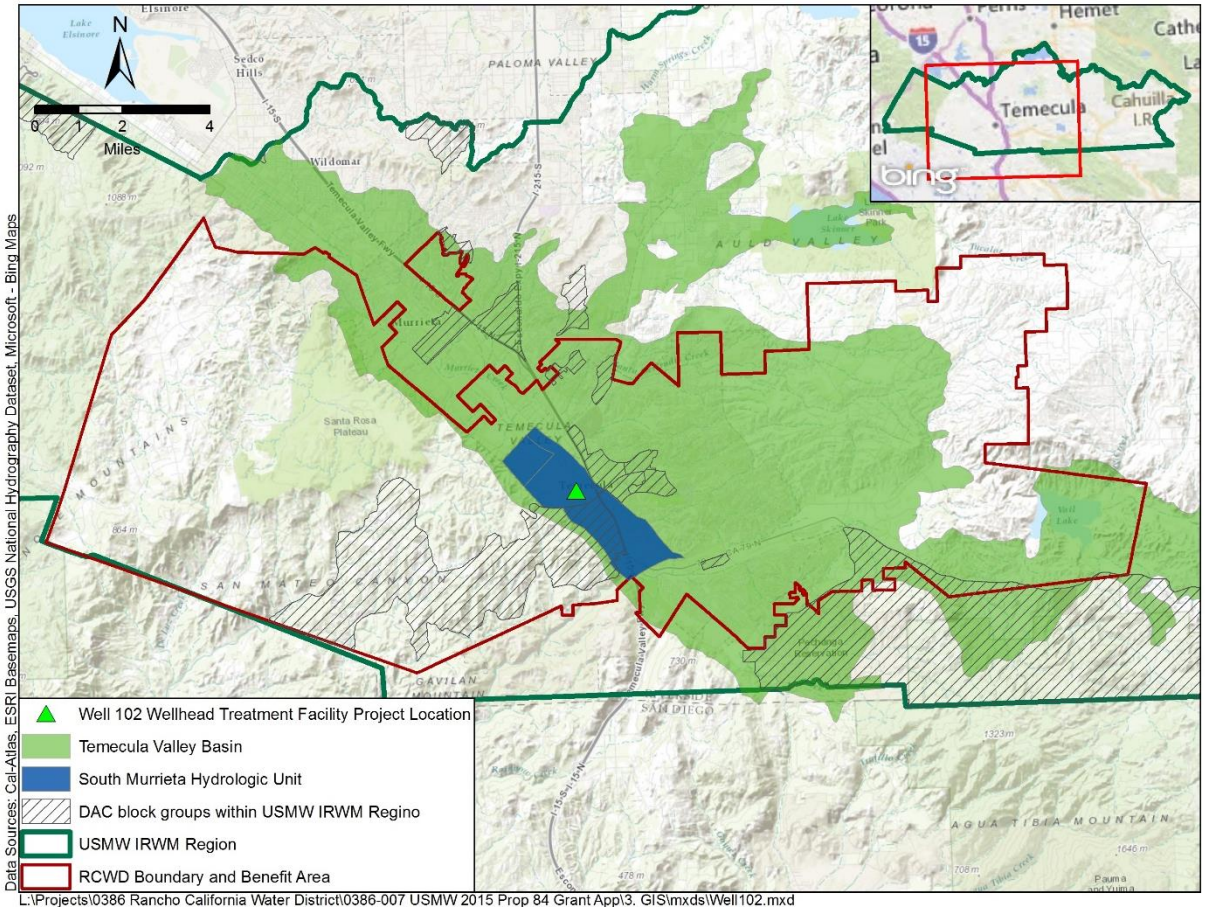


Figure 2-3: Well 102 Wellhead Treatment Facility Project Location Detail

Project Physical Benefit

The following physical benefits are claimed for the Project and are listed in the tables below.

- Water Supply Produced
- Water Quality Improved through Iron and Manganese Removal

Primary Physical Benefit: Water Supply Produced

The table below provides information on the benefit of potable water supply produced. Currently, RCWD Wells No. 101 and 118 produce the budgeted allotment of groundwater from the South Murrieta HU (1,000 AFY); however, given the poor water quality of these wells and the deteriorating condition of the well casings, reliable production is not a certainty. The Well 102 Wellhead Treatment Project removes this uncertainty by providing a water supply source from a well that has been verified to be in good condition and can be treated for its water quality issues (Fe and Mn). The table below reflects the potential for the production from the Basin to drop to 0 AFY, from either physical or regulatory restriction, leading to shutdown of Wells 101 and 118, should the Well 102 Wellhead Treatment Project not be constructed.

Table 5 – Annual Project Physical Benefits

Project Name: Wellhead Treatment Facilities – Well 102 Project
Type of Benefit Claimed: Water Supply Produced
Units of the Benefit Claimed: Acre feet per year (AFY)
Anticipated Useful life of Project: 25 years

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
2015-2016	0	0	0
2017 - 2041	0	1,000	1,000

Comments: The potable supply produced is based on the *Determination of Sustainable Yield of the North and South Murrieta Valley Ground Water Subunits* (Geoscience, April 2013 Executive Summary, pg.2). The above benefits assume that Well No. 101 and 118 will be shut down as soon as the Well 102 treatment project commences, and that Well 102 will pump the budgeted allotment of groundwater from the South Murrieta HU. Benefits will begin following construction completion, beginning in 2017, and will extend for the useful life of the well, 25 years.

Secondary Physical Benefit: Water Quality Improved through Iron and Manganese Removal

The table below provides information regarding the benefit of water quality improvements as related to iron and manganese removal that will be made possible through the construction of wellhead treatment on Well 102.

Table 5 – Annual Project Physical Benefits **Project Name: : Wellhead Treatment Facilities – Well 102 Project** **Type of Benefit Claimed: Water Quality Improved through Iron and Manganese Removal** **Units of the Benefit Claimed: mg/L** **Anticipated Useful Life of Project (years): 25 years**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Difference**
2015 - 2016	Iron = 0.30 Manganese = 0.37	Iron = 0.30 Manganese = 0.37	Iron = 0 Manganese = 0
2017 - 2039	Iron = 0.30 Manganese = 0.37	Iron = 0.15 Manganese = .03	Iron = 0.15 Manganese = 0.34
Comments: Pilot Study Report for RCWD Well 102 (Pureflow, August 2014) page i – ii; 1; 15 – 25). Benefits will begin following construction completion, beginning in 2017, and will extend for the useful life of the well, 25 years.			

Technical Analysis of Physical Benefits Claimed

Primary Benefit: Water Supply Produced

1) Explanation of the Need for the Project, Including Recent and Historical Conditions
Historically, Well 102 has been used as a redundant supply of recycled water due to its good production potential, but negative water quality issues. The well generally does not supply groundwater unless a major planned or unplanned supply outage occurs elsewhere in the recycled water system. Well 101 and 118 have typically produced the majority of the groundwater from this hydrologic unit for potable water use.

Recently, water quality mandates from the CDPH require RCWD to permanently address the elevated iron and manganese concentrations as a condition to continue production from this groundwater basin. RCWD conducted a planning study (Wellhead Treatment Strategy and Preliminary Design, January 2013) to determine the optimal solution, both physically and economically, for continuing potable water production from this hydrologic unit. The study concluded that Well 102 was the best site due to its large site footprint (improvements constructible without land acquisition), good production potential and the excellent physical condition of Well 102.

The Project is needed because, without construction of the Well 102 Wellhead Treatment Facilities, production in this hydrologic unit is anticipated to continue to decline due to the poor physical shape of the existing production wells (Well 101 and 118) and is subject to regulatory orders to cease and desist unless RCWD proactively pursues implementation of a permanent water quality improvement. This would reduce RCWD's production of a local, sustainable water supply production by 1,000 AFY on average and require additional imported supply.

2) Estimates of Without Project Conditions
If no action is taken, ultimately, production will cease from the Hydrologic Unit, resulting in a decrease of 1,000 AFY to 1500 AFY of local supply and requiring increased imported water supply.

3) Descriptions of Methods Use to Estimate Physical Benefits
In early 2013, RCWD contracted with Geoscience Support Services, Inc. (RCWD's Hydrogeologist) to conduct pump testing at Well 102 while monitoring the hydrologic basin to develop a well-founded estimate of long-term sustainable production. Geoscience concluded that the safe yield from the hydrologic unit is approximately 1,000 AFY on average. (Geoscience, April 2013. *Determination of Sustainable Yield of the North and South Murrieta Valley Ground Water Subunits,* Executive Summary, pg.2)

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits
New facilities required to obtain physical benefits include:

- Well pump and motor replacement capacity of 250 horsepower
- 200 lb/day capacity on-Site Sodium Hypochlorite (NaOCl) generation and feed system for oxidation and disinfection of potable water
- Three (3) ASME rated greensand or proprietary media pressure filters (2 duty, 1 standby) for removal of Iron (Fe) and Manganese (Mn).
- 106,000 gallon capacity bolted steel backwash settling tank with supernatant return system
- Associated piping, valves, electrical, instrumentation and site improvements for a fully operational facility
- Extension and connection of Well 102 discharge piping to the existing potable water distribution system

New policies required to obtain physical benefits include:

- No new policies required. RCWD conducts an annual groundwater audit to budget water production from each available hydrologic groundwater unit. This groundwater management approach will continue for this basin with the implementation of Well 102.

New actions required to obtain physical benefits include:

- Amended water supply permit from CDPH will need to be obtained.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them
A Mitigated Negative Declaration has been completed for the Project. Mitigation measures during construction include practices to reduce air pollution and noise and minimize construction impacts to water quality. RCWD will ensure safe handling of any mineral or archeological objects should they be uncovered onsite. Traffic abatement measures will be implemented to allow for connection to an existing potable water distribution pipeline underneath an asphalt roadway.

Periodically, the onsite backwash holding tank will need to be emptied and the non-hazardous Fe/Mn residual filter backwash waste will need to be trucked to RCWD's nearby wastewater treatment facility for drying and disposal. This low volume activity is estimated to occur bi-annually once treatment at Well 102 is initiated. Potential adverse effects will be mitigated by following RCWD protocols for transporting these substances.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness
The Project addresses long-term drought preparedness by ensuring a reliable and local water supply well into the future, as opposed to reliance on imported water. The Project provides efficient groundwater basin management by utilizing this hydrologic unit for supplies ranging from 1,000 AFY that would otherwise go unused without action to improve water quality. Therefore, the Project will effectively address long-term drought preparedness by promoting efficient groundwater basin management.

Secondary Benefit: Water Quality Improved through Iron and Manganese Removal

1) Explanation of the Need for the Project, Including Recent and Historical Conditions
Historically, all wells in this Hydrologic Unit have produced groundwater with concentrations of iron and manganese above the CDPH secondary MCL. The reduction in iron and manganese from the groundwater production in the South Murrieta Hydrologic Unit greatly decreases the issues attendant to these constituents, primarily color (staining), odor and taste.

Recently the CDPH has mandated RCWD to resolve the water quality issues with a permanent solution. After a thorough planning and pre-design study it was determined that the Well 102 Wellhead Treatment Project was the best solution to allow RCWD to continue water production from this basin and provide a higher quality water than provided currently or historically.

The Project is needed because water quality exceeds the sMCL standards set by CDPH for iron and manganese and presents color, taste and odor issues. The Project will remove these constituents to ensure a reliable and high quality water supply.

2) Estimates of Without Project Conditions
If no action is taken, ultimately, production will cease from this hydrologic unit and water quality will not be improved.

3) Descriptions of Methods Used to Estimate Physical Benefits
RCWD conducted two rounds (different vendors) of pilot testing (pre- and post-well rehabilitation) on the potential treatment solution. This was a small scale test of the actual filtration media that would be used to remove the elevated concentrations of iron and manganese. Pilot test results indicate that greensand and proprietary media types specific to Fe/Mn removal can reduce the Fe/Mn to levels well below the CDPH sMCL. Pilot Study Report for RCWD Well 102 (Pureflow, August 2014. Pilot Study Report for RCWD Well 102. page i – ii; 1; 15 – 25). Pre-well rehabilitation, Fe levels were measured at 0.30 mg/L and Mn levels were measured at 0.37 mg/L, while post-well rehabilitation, Fe levels were measured at 0.15 mg/L and Mn levels were measured at 0.03 mg/L. This indicates that the Project will yield a 0.15 mg/L improvement in Fe concentrations and a 0.34 mg/L improvement in Mn concentrations.

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits
New facilities required to obtain physical benefits include:

- Well pump and motor replacement 250 horsepower capacity
- 200 lb/day capacity on-Site Sodium Hypochlorite (NaOCl) generation and feed system for oxidation and disinfection of potable water
- Three (3) ASME rated greensand or proprietary media pressure filters (2 duty, 1 standby) for removal of Iron (Fe) and Manganese (Mn)
- 106,000 gallon capacity bolted steel backwash settling tank with supernatant return system
- Associated piping, valves, electrical, instrumentation and site improvements for a fully operational facility
- Extension and connection of Well 102 discharge piping to the existing potable water distribution system

New policies required to obtain physical benefits include:

- No new policies required. RCWD conducts an annual groundwater audit to budget water production from each available hydrologic groundwater unit. This groundwater management approach will continue for this basin with the implementation of Well 102.

New actions required to obtain physical benefits include:

- Amended water supply permit from CDPH will need to be obtained.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them
A Mitigated Negative Declaration has been completed for the Project. Mitigation measures during construction include practices to reduce air pollution and noise and minimize construction impacts to water quality. RCWD will ensure safe handling of any mineral or archeological objects should they be uncovered onsite. Traffic abatement measures will be implemented to allow for connection to an existing potable water distribution pipeline underneath an asphalt roadway.

Periodically, the onsite backwash holding tank will need to be emptied and the non-hazardous Fe/Mn residual filter backwash waste will need to be trucked to RCWD's nearby wastewater treatment facility for drying and disposal. This low volume activity is estimated to occur bi-annually once treatment at Well 102 is initiated. Potential adverse effects will be mitigated by following RCWD protocols for transporting these substances.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness
The Project addresses long term drought preparedness by ensuring a reliable and local water supply well into the future, as opposed to reliance on imported water. The project provides efficient groundwater basin management by utilizing this hydrologic unit for supplies ranging from 1,000 AFY that would otherwise go unused without action to improve water quality. Therefore, the Project will effectively address long-term drought preparedness by promoting efficient groundwater basin management.

Direct Water-Related Benefit to a DAC

The Project area does not encompass a DAC.

Project Performance Monitoring Plan

The following table describes the Project Performance Monitoring Plan.

Table 6 – Project Performance Monitoring Plan
Project: Wellhead Treatment Facilities – Well 102 Project

Proposed Physical Benefits	Targets	Measurement Tools and Methods
Primary benefit: Water Supply Produced	Produce an additional 1,000 AFY of groundwater supply for potable use	Tools and Methods: Monitoring will be accomplished through the use of an in-line flow meter that will record both instantaneous and totalized flow from Well 102 yielding easily monitored production over any desired time period. Locations: Data will be collected at the Well 102 site. Data to be Collected: Instantaneous and totalized flow from Well 102 Monitoring data will be used to measure performance by providing a direct measurement of water flow from the well that represents the water supply produced. The flow meter data will be utilized to assess both the health of the well (instantaneous production) and total production from the facility (totalized production). The totalized production figure is reported monthly internally and is utilized to track annual production numbers to ensure full utilization of the well and underlying hydrologic basin.

Table 6 – Project Performance Monitoring Plan **Project: Wellhead Treatment Facilities – Well 102 Project**		
Proposed Physical Benefits	**Targets**	**Measurement Tools and Methods**
		The monitoring tools and targets are appropriate for the benefits claimed because they will provide a direct measurement of the water supply produced from Well 102.
Secondary benefit: Water Quality Improved through Iron and Manganese Removal	Improve water quality pumped from the Well 102 by Fe = 0.15 mg/l and Mn = 0.34 mg/l	Tools and Methods: Water samples will be drawn from the on-site sampling stations and lab tested for Fe and Mn concentrations, and comparing to historical Fe and Mn concentrations. Locations: Data will be collected at the Well 102 site. Data to be Collected: Water quality concentrations (Fe and Mn concentrations in mg/L) in Well 102 water samples. Monitoring data will be used to measure performance by comparing the concentration of Fe and Mn in Well 102 water supply to historical concentrations. Water quality data is monitored by RCWD and reported to the CDPH at regular intervals to ensure compliance will all local, state and federal water quality guidelines. Iron and Manganese concentrations in the treated water will be used to track and optimize treatment efficiency. The frequency of the testing will be determined by the State, but is anticipated to be no less frequent than quarterly. The monitoring tools and targets are appropriate for the benefits claimed because they will provide a direct measurement of the water quality improvement in concentrations of Fe and Mn produced from Well 102.

Cost Effectiveness Analysis

Table 7 – Cost Effectiveness Analysis Project Name: Wellhead Treatment Facilities – Well 102 Project		
Question 1	Types of benefits provided as shown in the Annual Project Physical Benefits Section (above)	• Water Supply Produced • Water Quality Improved through Iron and Manganese Removal
Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?	Yes. A thorough feasibility study and pre-design was completed that analyzed all available wells in this basin for continued production and tested various alternative treatment techniques for water quality compliance. The Well 102 site and treatment system described herein was identified as the optimal solution for continued production from both a qualitative and quantitative perspective. (See page ES-8 in Wellhead Treatment Strategy and Pre-Design Report)
	If no, why?	Not applicable
	If yes, list the methods (including the proposed project) and estimated costs.	• Individual Treatment at Well 102 (proposed project) - $572/AF • Individual Treatment at Well 101 - $781/AF • Individual Treatment at Well 118 - $668/AF • Regional Treatment at Well 101 – not feasible • Regional Treatment at Well 118 – not feasible • Regional Treatment at Well 102 - $737 - $902/AF • Down hole well modification – Not feasible based on physical testing Alternative treatment methods were evaluated; however, and were considered not feasible due to high volume/hazard waste streams, inefficient/ineffective processes and/or higher costs. See table 5-5 in *Wellhead Treatment Strategy and Preliminary Design Report, January 2013*
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.	The Well 102 project is the most cost effective solution identified in the study with an estimated unit cost of ~$572/AF. This is approximately half the cost of treated imported water.

Comments: See table 5-5 in *Wellhead Treatment Strategy and Preliminary Design Report, January 2013*

Water Use Efficiency Turf Removal Projest

The Water Use Efficiency Turf Removal Project (Project) is a collaborative program by Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD) to provide turf replacement rebates across Southern California. This element will be regionally integrated with local agencies' turf removal programs to target Commercial/Institutional/Homeowner Association (HOA) customers.

The Project provides for a $1.00/square foot (sf) turf removal rebate in addition to MWDSC's turf removal rebate program and property owner's local contribution. This rebate will supplement the $1.00/sf rebate already offered by the Metropolitan Water District of Southern California (MWDSC) through its SoCal Water$mart program, which will also serve as part of the Project's cost match. Should MWDSC funds be expended prior to this Project's completion, matching funds will be provided through a combination of EMWD in-kind work and turf purchase costs. The Project's goal is to remove 455,000 sf of turf and replace with lower water demand landscaping, thereby reducing overall water demand. The Project is expected to be available to a minimum of eight sites and maximum of 100 sites, depending on the size of each site.

The physical component of the Project includes turf removal and replacement with water-efficient landscaping, permanently reducing water demand for landscape irrigation. The Project will target the service areas of EMWD and WMWD within the Upper Santa Margarita Watershed IRWM Region's boundaries. Because this Project can commence immediately upon DWR funding approval, water savings will begin immediately in the first year. Promotional materials from previous programs will be modified to be adapted to the Project, which allows for a quick start up time. EMWD will verify turf replacement through the application process, which includes a pre- and post-photographs of the area, material receipts, and, in some situations, inspections by the Conservation Program Specialist.

The Project physical benefits include reduced water demands, and therefore reduced reliance on imported water, by 61 AFY, reduced energy by 150,120 kWh/year and greenhouse gases (GHG)/carbon emissions by 92,024 lbs Co2e/year.

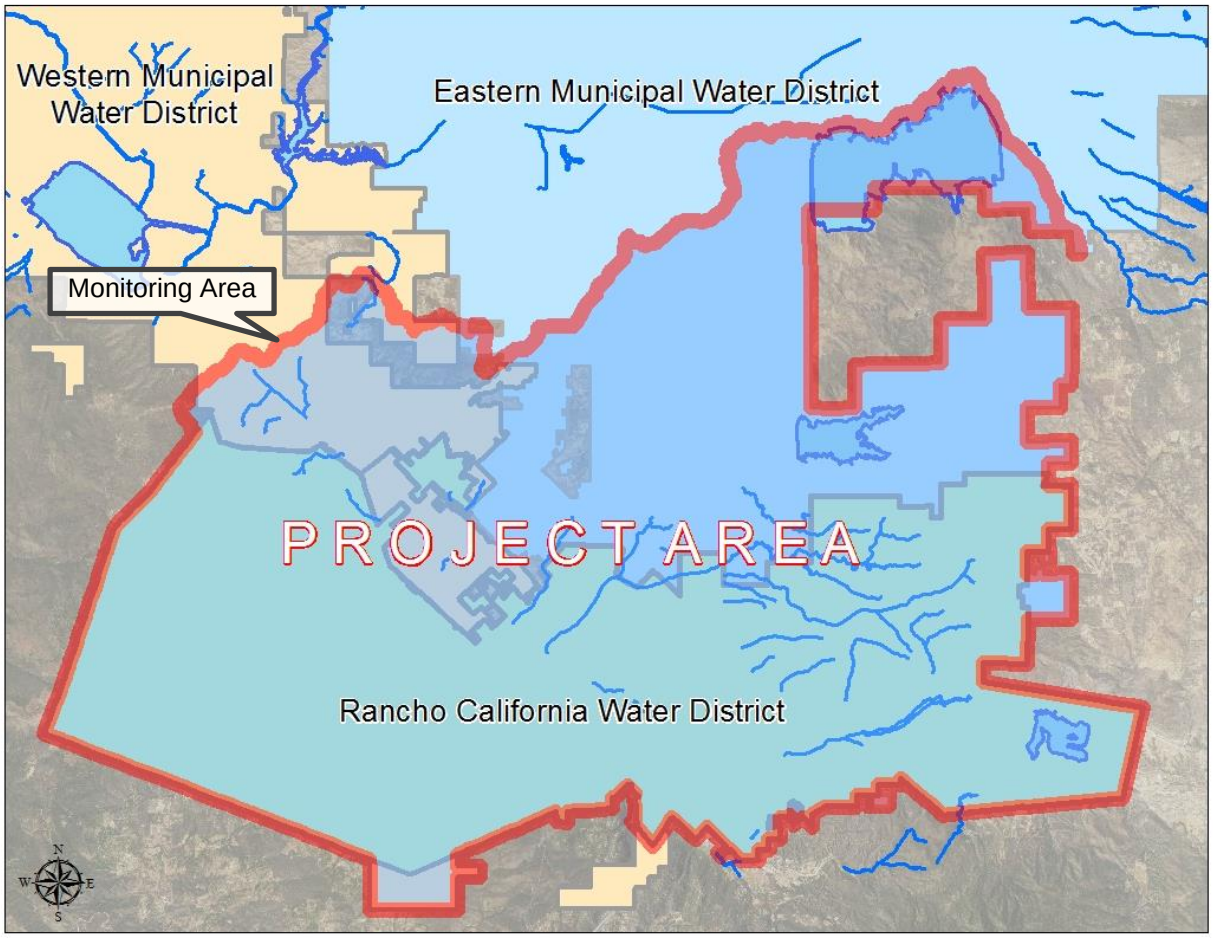
The intended outcome of the Project is to encourage the replacement of water demanding turf with drought tolerant plants to create lasting water demanding landscapes, help the Region to reduce its reliance on imported water, and reduce the energy use and GHG emissions associated with imported water to mitigate climate change.

The Project will address the current needs of the USMW IRWM Region by conserving water in order to reduce dependence on imported water and increase local water supply available for existing drinking water demands, and will provide regional benefits by reducing water demand and increasing the availability of a popular program offered through the region. This supports the following objectives of the USMW IRWM Plan: Reduce regional potable water consumption, adapt to and mitigate against climate change by promoting adaptation strategies and reducing water related greenhouse gas emissions, and reduce controllable pollutant sources to 303(d) listed receiving waters.

Project Map

Figure 2-4 shows the Project area in relation to EMWD and WMWD service areas (which overlap RCWD's service area, as shown in Figure 2-4). Monitoring locations will occur at each turf removal site for those water customers who choose to take part in the Project; therefore, specific locations will be identified at a later time. The Project is not expected to directly affect water resources; therefore, these are not labeled on Figure 2-4.

Figure 2-4: Water Use Efficiency Turf Removal Project Map



Project Physical Benefit

The following physical benefits are claimed for the Project:

- Primary Benefit: Water Supply Saved
- Secondary Benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use

The table below provides information regarding the benefit of water supply saved through irrigation reduction. This benefit will be achieved through the replacement of turf with lower water demand landscaping.

Primary Benefit: Water Supply Saved

Table 5 – Annual Project Physical Benefits

Project Name: Water Use Efficiency Turf Removal Project
Type of Benefit Claimed: Water Supply Saved
Units of the Benefit Claimed: Acre feet per year (AFY)
Anticipated Useful life of Project: 20 years

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project
2015	0	12	12
2016	0	24	24
2017	0	36	36
2018	0	48	48
2019-2034	0	61	61
2035	0	48	48
2036	0	36	36
2037	0	24	24
2038	0	12	12

Comments:
Water savings from Turf removal and replacement with California Friendly landscape is estimated to be 44 gal/sf/yr (reference: MWDOC, 2013. *Comprehensive Landscape Water Use Efficiently Program*. Page 11.), and EMWD plans for 455,000 square feet (sf) of turf to be replaced through this project. Therefore, 455,000 sf x 44 gal/sf/yr = 61 AFY. Benefits will begin accruing immediately upon Project implementation, starting in 2015 and increasing until the full benefit is realized in 2019, as shown in the schedule in Attachment 5. Benefits will then decrease as the turf removal sites each reach the end of the Project life.

Secondary Benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use

The table below provides information regarding the benefits of energy savings and GHG reductions (in CO_2 equivalents or CO_2e) provided by the reduction in imported water use expected through removal of turf.

Table 5 – Annual Project Physical Benefits
Project Name: Water Use Efficiency Turf Removal Project
Type of Benefit Claimed: Energy Saved and GHGs Reduced through Reduced Imported Water Use
Units of the Benefit Claimed: Energy: Kilowatt Hours/ year (KWh/yr)
GHG: Pounds CO_2 equivalents/year (CO_2e/yr)
Anticipated Useful Life of Project (years): 20 years

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
2015	Energy: 0 GHGs: 0	Energy: 0 GHGs: 0	Energy: 0 GHGs: 0
2016	Energy: 0 GHGs: 0	Energy: 37,500 GHGs: 23,006	Energy: 37,500 GHGs: 23,006
2017	Energy: 0 GHGs: 0	Energy: 75,100 GHGs: 46,012	Energy: 75,100 GHGs: 46,012
2018	Energy: 0 GHGs: 0	Energy: 112,600 GHGs: 69,018	Energy: 112,600 GHGs: 69,018
2019-2035	Energy: 0 GHGs: 0	Energy: 150,120 GHGs: 92,024	Energy: 150,120 GHGs: 92,024
2036	Energy: 0 GHGs: 0	Energy: 112,600 GHGs: 69,018	Energy: 112,600 GHGs: 69,018
2037	Energy: 0 GHGs: 0	Energy: 75,100 GHGs: 46,012	Energy: 75,100 GHGs: 46,012
2038	Energy: 0 GHGs: 0	Energy: 37,500 GHGs: 23,006	Energy: 37,500 GHGs: 23,006

Comments:

Energy savings are calculated based on the water supply saved (primary benefit), applied to assumed imported water dependence, energy needs for importing water and associated GHG emissions from energy. Currently, EMWD relies on 61% imported water from their water wholesaler MWDSC, based on average 2009-2013 water use in EMWD's service area, which comes from both the SWP and CRA. Approximately 80% of its imported water is delivered from the SWP, and 20% from the CRA (Eastern Municipal Water District, 2011. 2010 Urban Water Management Plan (UWMP). Page 43.). Given that 61 AFY of water will be saved through implementation of this Project (see primary benefit), the volume of imported water saved can be estimated at 37 AFY (61% of 61 AFY). This can be further broken down using the percentages of SWP and CRA water received by RCWD, with 30 AFY from the SWP and 7 AFY from the CRA.

According to DWR Bulletin B-132-13, page B-20, pumping of SWP water supply to Pearblossom Pump Station, the first point "upstream" from where EMWD receives imported water, results in a cumulative 4,549 kWh/AF. The Colorado River Aqueduct is estimated to require 1,976 kWh/AF according to CPUC Study 1, page 64. Therefore, using recycled water and outdoor water conservation in lieu of imported potable water will result in energy savings calculated as 30 AFY x 4,549 kWh/AF + 7 AFY x 1,976 kWh/AF =150,120 kWh/yr.

GHG emissions reduced are estimated based on the energy reduced per year multiplied by the total output emission rate of 613.28 lb CO_2e/MWh or 0.613 lb CO_2e/kWh for California (as reported for the CAMX sub-region in the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 9th edition Version 1.0 Year 2010 Summary Tables, Page 1.). Therefore, 145,156 kWh/yr x 0.613 lb CO_2e/kWh = 88,981 lb CO_2e/yr.

Benefits will begin accruing upon Project implementation, starting in 2016 and increasing until the full benefit is realized in 2019, as shown in the schedule in Attachment 5. Benefits will then decrease as the turf removal sites each reach the end of the Project life.

Technical Analysis of Physical Benefits Claimed

Primary Benefit: Water Supply Saved

1) Explanation of the Need for the Project, Including Recent and Historical Conditions

The purpose of this Project is to sustainably reduce water demand by removing water intensive, non-functional turf and replace with lower water demand landscaping, to create a more resilient water supply.

The current drought has the potential to impact the human right to water, and increase the risk of not meeting existing demands. These issues are compounded by the fact that the Upper Santa Margarita Watershed is a fast growing region. Even with the Watershed's available groundwater basins, there is potential for overdraft conditions. The Upper Santa Margarita Watershed is also reliant on imported water, and is significantly affected by the past years' curtailment of imported supplies. With the uncertainties regarding the length of the current drought and climate change-related impacts, competing needs are taking even greater precedence than ever, affecting how the Watershed manages water for the future.

"Funding Need" is justified because turf replacement is not locally cost effective, as cost savings do not outweigh the initial cost of replacement; however, water savings are significant. The current drought has demonstrated that our thirsty landscaping, highlighted by ubiquitous turf, is not an appropriate way to use our valuable water resources. Reservoirs and groundwater basins are at historic lows throughout the State further expediting the need to immediately reduce water demand. In addition, the environmental and financial costs of irrigating turf and other water intensive landscaping will continue to rise as our population increases and available water supplies are stressed. Programs such as the proposed Project not only will immediately reduce water demand, they will assist in achieving a "tipping point" where our communities will better recognize that California Friendly-type landscaping is beautiful, economical and more appropriate for Southern California's arid climate. This type of program will assist in changing the landscape "culture" to the point where incentives to remove turf will no longer be needed.

2) Estimates of Without Project Conditions

Without this project, 61 AFY of water supply will continue to be used to irrigate the 455,000 sq ft of turf to be replaced.

3) Descriptions of Methods Use to Estimate Physical Benefits

Water savings from turf removal and replacement with California Friendly landscape is estimated to be 44 gal/sf/yr (reference: see page 11; 2013, MWDOC "Comprehensive Landscape Water Use Efficiently Program"). For this program, 455,000 sf of turf will be removed, which equates to 455,000 sf X 44 gal/sf = 61.44 AFY of water saved.

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

No new facilities, policies nor actions are required to obtain the physical benefits of the Project.

This is an integrated, collaborative and inter-regional project. The proposed Project identified herein is an extension of the Proposition 84 IRWM 2014 Drought Grant collaboration between EMWD, WMWD, RCWD and Santa Ana River Project Authority (SAWPA) agencies, and MWDSC. This partnership has reduced the costs for administration by utilizing MWDSC's existing administration (at no additional cost), Southern California-wide public outreach and, initially in last year's grant, development of mapping tools. Each agency's participation creates a synergistic, multiplicative effect on benefits.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them

There are no potential adverse physical effects associated with the Project. The proposed turf removal program is voluntary, resulting in turf removal and replacement with California Friendly-type landscaping beneficial to water supply as well as to the community. The Project is categorically exempt from CEQA.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness
The water supply savings benefit of the Project will help to reduce dependence on both imported and local water supplies. The Project integrates into the gaining synergy of changing Southern Californians' perspective on acceptable landscape in an arid climate. Not only will it immediately and permanently increase water conservation, positively affecting the current drought, it will improve the synergy to spur on other similar water conservation continuing to promote long-term reduction of water use. Therefore, the Project will contribute to water supply sustainability and reliability during water shortages by promoting water conservation.

Secondary Benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use

1) Explanation of the Need for the Project, Including Recent and Historical Conditions
The State of California has recognized that climate change is already affecting California and is projected to continue to do so well into the foreseeable future (California Energy Management Agency, et al, 2012. California Climate Change Adaptation Planning Guide. Page 3.) Reducing energy and its associated greenhouse gas emissions will help to mitigate climate change. According to the California Energy Commission, about 4% of the energy used in California is used to produce, transport, treat, and distribute water. Generating the energy needed to produce, convey, and distribute water also produces greenhouse gas emissions that contribute to global warming, which itself threatens California's water supply. The State has committed to reducing its emissions by 15% by 2020 under AB-32, the Global Warming Solutions Act of 2006.

Decreasing the amount of energy required to produce water supply is an objective of the California Water Action Plan, and decreasing the emission of greenhouse gases is a Planning Target of the Upper Santa Margarita Watershed IRWM Plan. The Project will contribute to both the California Water Plan objective and the USMW IRWM Plan Planning Target by reducing the amount of energy used to import water to the UWMW Region along with the associated emissions.

Reducing the need to import water and rely on local water sources will reduce energy demand especially in the summer months when energy conservation is most needed. Imported water makes up 61% of EMWD's water supply coming from the SWP and the Colorado River. EMWD and WMWD are looking to reduce their reliance on imported water supplies and thus reduce the amount of energy required to import the water to the region. Modifying landscapes to include less turf and include more native, drought tolerant plants an exceptional way to reduce water demand, and associated and greenhouse gas emissions from less imported water.

2) Estimates of Without Project Conditions
If the Project does not move forward, turf grass will continue to demand a large volume of imported water, and therefore, imported water will continue to be use energy at a rate of 150,120 kWh/yr which is associated with GHG emissions of 92,024 lb of CO_2e/yr.

3) Descriptions of Methods Use to Estimate Physical Benefits
Energy savings were determined based on the volume of water saved (see Primary Benefit), which assumes 44 gal/sf/yr saved and 455,000 square feet of turf grass replaced with drought tolerant plants. Currently, EMWD relies on 61% imported water from their water wholesaler MWDSC, based on average 2009-2013 water use in EMWD's service area, which comes from both the SWP and CRA. Approximately 80% of its imported water is delivered from the SWP, and 20% from the CRA (Eastern Municipal Water District, 2011. 2010 Urban Water Management Plan (UWMP). Page 43.). Given that 61 AFY of water will be saved through implementation of this project (see primary benefit), the volume of imported water saved can be estimated at 37 AFY (61% of 61 AFY). This can be further broken down using the percentages of SWP and CRA water received by RCWD, with 28 AFY from the SWP and 9 from the CRA. It is assumed that WMWD's imported water use and breakdown of SWP to CRA water are equivalent to EMWD's for the purposes of this analysis.

According to DWR Bulletin B-132-13, page B-20, pumping of SWP water supply to Pearblossom Pump Station, the first point "upstream" from where EMWD receives imported water, results in a cumulative 4,549 kWh/AF. The Colorado River Aqueduct is estimated to require 1,976 kWh/AF according to CPUC Study 1, page 64. Therefore, using recycled water and outdoor water conservation in lieu of imported potable water

will result in energy savings calculated as 30 AFY x 4,549 kWh/AF + 7 AFY x 1,976 kWh/AF =150,120 kWh/yr.

GHG emissions reduced are estimated based on the energy reduced per year multiplied by the total output emission rate of 613.28 lb CO_2e/MWh or 0.613 lb CO_2e/kWh for California (as reported for the CAMX sub-region in the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 9th edition Version 1.0 Year 2010 Summary Tables, Page 1.). Emissions are equated as 150,120 kWh/yr x 0.613 lb CO_2e/kWh = 92,024 lb CO_2e/yr.

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits
No new facilities, policies nor actions are required to obtain the physical benefits of the Project.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them
There will be no adverse physical effects from the Project. The Project is categorically exempt from CEQA.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness
The Project integrates into the gaining synergy of changing Southern Californians' perspective on acceptable landscape in an arid climate. Not only will it immediately and permanently increase water conservation, positively affecting the current drought, it will improve the synergy to spur on other similar water conservation continuing to promote long-term reduction of water use. Therefore, the Project will contribute to water supply sustainability and reliability during water shortages by promoting water conservation.

Direct Water-Related Benefit to a DAC

The Project area does not encompass a DAC.

Project Performance Monitoring Plan

The following table describes the Project Performance Monitoring Plan.

Table 6 – Project Performance Monitoring Plan
Project: Water Use Efficiency Turf Removal Project

Proposed Physical Benefits	Targets	Measurement Tools and Methods
Primary benefit: Water Supply Saved	Reduce potable water demand through turf replacement by 61 AFY	Tools and Methods: The Project will provide an accounting of the actual square footage of turf removed (according to turf removal completion forms) multiplied by an assumed water savings of 44 gal/sf/yr. Locations: Data will be collected at each turf removal site. Data to be Collected: Reduced potable water demand based on square feet of turf replaced with lower water demand landscaping. Monitoring data will be used to measure performance by multiplying the square feet of turf replaced with by an assumed water savings of 44 gal/sf/yr. The monitoring tools and targets are appropriate for the benefits claimed because they will provide an accurate estimate of the water saved through turf replacement based on actual turf replacement.

Table 6 – Project Performance Monitoring Plan **Project: Water Use Efficiency Turf Removal Project**		
Proposed Physical Benefits	**Targets**	**Measurement Tools and Methods**
Secondary benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use	Energy Savings of 150,120 kWh/year and GHG reductions of 92,024 lb CO_2e/yr.through a reduction of imported water demand from the Colorado River and State Water Project.	Tools and Methods: The Project will provide an accounting of the energy saved and GHG reduced by first estimating the volume of water saved by taking the actual square footage of turf removed (according to turf removal completion forms) multiplied by an assumed water savings of 44 gal/sf/yr (calculated as the primary benefit), and then applying the percentage of imported water used by EMWD and WMWD in that year (based on actual water supplies delivered by EMWD and WMWD). Factors will be applied to the imported water reduced to estimate the volume that would have come from the SWP (80%) and from the CRA (20%). To calculate the energy savings, the actual irrigation usage will be multiplied by the estimation of energy usage (kWh) per AF, as provided by DWR's bulletin 132. To calculate the GHG emissions reduction, the energy usage reduction will be multiplied by the factor of 0.613 lb CO_2e/kWh for California (as reported for the CAMX sub-region in the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 9th edition Version 1.0 Year 2010 Summary Tables, Page 1.) Locations: Data will be collected at each turf removal site through turf removal reporting. Data to be Collected: Reduced potable water demand based on square feet of turf replaced with lower water demand landscaping, energy use for importing water and GHG emissions reduced. Monitoring data will be used to measure the amount of energy saved and GHG emissions reduced through known, established calculations of energy required to import water from the State Water Project and Colorado River Aqueduct, and GHG emissions associated with energy generation in California. The monitoring tools and targets are appropriate for the benefits claimed because they will provide an accurate estimate of the energy saved and GHG emissions reduced from reduced imported water demand.

Cost Effectiveness Analysis

Table 7 – Cost Effectiveness Analysis Project Name: Water Use Efficiency Turf Removal Project		
Question 1	Types of benefits provided as shown in the Annual Project Physical Benefits Section (above)	• Water Supply Saved • Energy Saved and GHGs Reduced through Reduced Imported Water Use
Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?	Yes
	If no, why?	Not applicable
	If yes, list the methods (including the proposed project) and estimated costs.	EMWD, WMWD and the MWDSC have water conservation programs including rebates for high efficiency toilets ($100), weather based irrigation controllers ($80/controller <1ac landscaping); $35/station>1 acre landscaping, high efficiency clothes washers ($85), rotating sprinkler nozzles ($4/nozzle) and rain barrels ($75). Ocean desalination and water reclamation are two resilient supplies that could be alternatives. • Recycled water development: $887/AF (reference: http://www.gwrsystem.com/index.php?option=com_content&view=article&id=9&Itemid=27 for OCWD GWRS project costs) • Ocean Desalination: $2,014/AF (reference: http://www.sdcwa.org/seawater-desalination for SDCWA Carlsbad Ocean Desal Plant)
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.	In addition to saving water, the proposed Project will further the synergy of changing Southern Californians' perspective on water use in an arid climate. Not only will it immediately and permanently increase water conservation, positively affecting the current drought, it will improve the synergy to spur on other similar water conservation continuing to promote long-term reduction of water use.
Comments: None		

Expanded Recycled Water and Plant Conversion Project

The Expanded Recycled Water and Plant Material Conversion Project (Project) will meet a regional need to decrease the demand on imported potable water supplies and increase recycled water use. The Project is proposed for funding by Rancho California Water District (RCWD) in partnership with the City of Temecula (City), as well as La Serena Homeowners Association (HOA), Rancho Serrano HOA, and Paseo Del Sol HOA.

The Project seeks to eliminate the current potable water demand used for the irrigation of common areas at nine sites within RCWD's service area through connection to RCWD's recycled water system. Through the conversion process, the Project will seek to reduce water demand further through the elimination of turf areas at two sites (Rancho Serrano HOA and La Serena HOA) by the installation of drought tolerant plants and drip irrigation. Additionally, these two sites will be used as demonstration gardens for public outreach and education to promote drought tolerant plants and recycled water use. In addition to decreasing the imported water demand, energy consumption associated with the pumping and delivery of imported water will be reduced as local recycled water will offset this water demand.

The physical components of the Project will consist of the following activities:

- Connection of the nine converted irrigation systems to RCWD's recycled water mainline, which is supplied by RCWD's Santa Rosa Water Reclamation Facility (WRF). The Santa Rosa WRF, operated by RCWD, currently treats water to a tertiary level, but discharges it as effluent.
- Conversion of nine existing potable-water irrigation systems to efficient systems capable of and approved for distributing recycled water, which will include the installation of purple pipe equipment and correction of system inefficiencies such as broken equipment.
- Replacement of existing high water use plant materials at two of the nine sites with drought tolerant and aesthetically pleasing plant materials.
- Public outreach at two of the nine sites to demonstrate to the local community the benefits of the aforementioned irrigation system retrofits and use of drought tolerant plant materials, and to promote the importance of recycled water use.

The physical benefits of the Project eliminates 79.67 acre feet per year (AFY) of potable water demand for 992,559 square feet of irrigated landscape by connecting the sites to recycled water and by replacing high-water use plant materials with drought tolerant plant species. Reduced demand on imported water will reduce the associated energy costs of pumping the imported water to the region delivered through both the State Water Project (SWP) and Colorado River Aqueduct (CRA). In addition, an estimated 112,017 KWh/yr per year of electricity and 68,666 lb/yr of CO_2 equivalents (CO_2e) per year will be saved by reducing imported water demand.

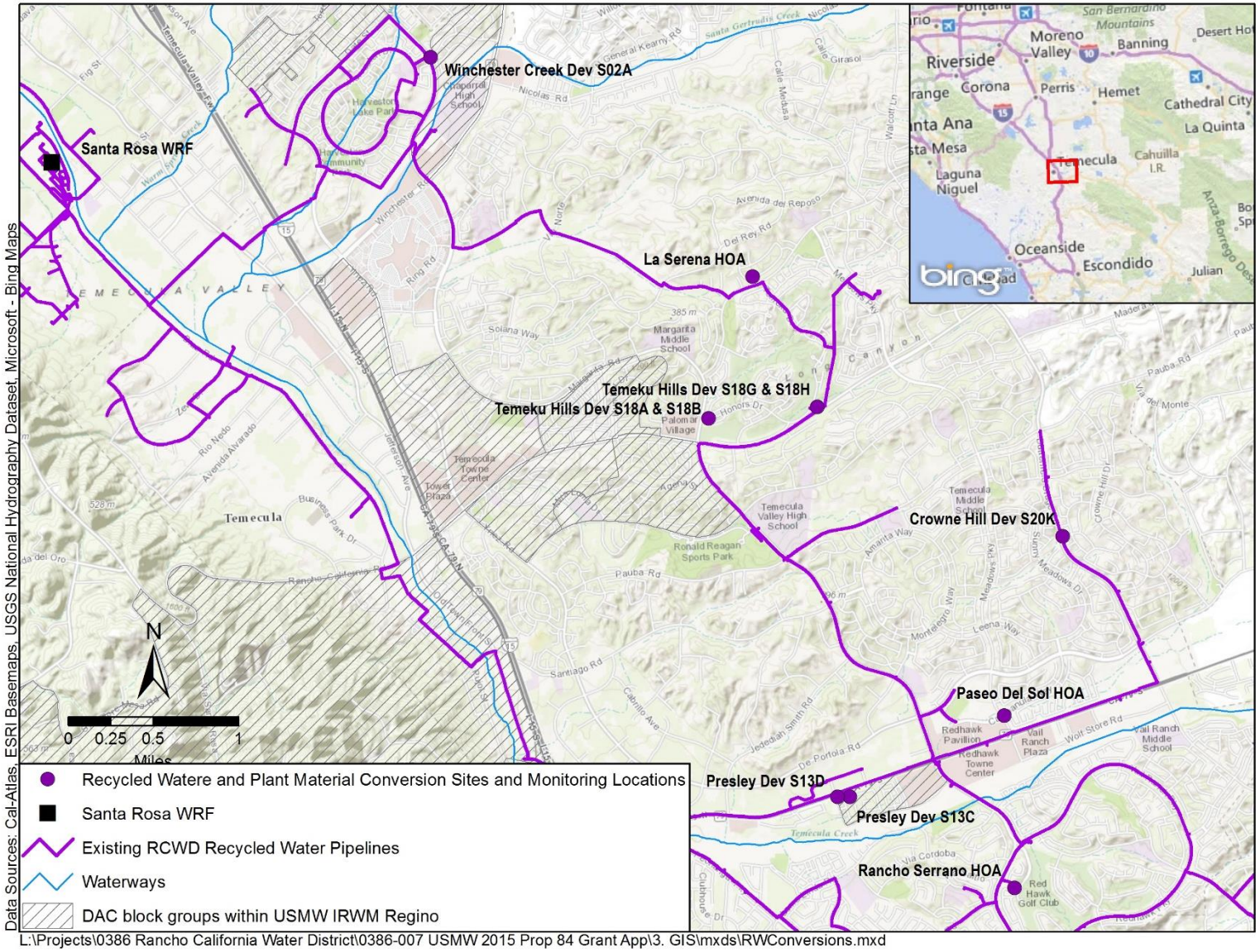
The desired outcome of the Project is to successfully convert potable irrigated landscape to use recycled water and replace high water use plants with drought tolerant species to reduce potable water demand, and reduce energy use and GHG emissions associated with the delivery of imported water. The Project will, in the context of California's historic drought conditions, function as a model of and set a new standard for water conservation and efficiency in a community of water users whose water is used primarily for the irrigation of relatively large outdoor landscapes.

The Project will address the current needs of the Region by supporting the following objectives of the USMW IRWM Plan: reduce regional potable water consumption, increase local supply development, and reduce controllable pollutant sources to 303(d) listed receiving waters.

Project Map

Figure 2-5 shows the Project area that consists of nine irrigation sites owned and maintained by the City of Temecula and HOAs. The Santa Rosa WRF is shown along with the corresponding recycled water distribution system to depict the expanse of the project across the service area. Monitoring locations will occur at each site.

Figure 5-5: Expanded Recycled Water and Plant Material Conversion Project



Project Physical Benefit

The following physical benefits are claimed for the Project and are listed in the tables below.

- Water Supply Recycled and Saved
- Energy Saved and GHGs Reduced through Reduced Imported Water Use

Primary Benefit: Water Supply Recycled and Saved

The table below provides information on the benefit of water supply recycled. This benefit is based on the total volume of irrigation water to be converted from potable to recycled water, as well as the water to be saved through conversion of high water use plant materials to drought tolerant plant species.

Table 5 – Annual Project Physical Benefits

Project Name: Expanded Recycled Water & Plant Material Conversion Project
Type of Benefit Claimed: Water Supply Recycled and Saved
Units of the Benefit Claimed: Acre feet per year (AFY)
Anticipated Useful Life of Project (years): 30

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2015 - 2016	0	0	0
2017	0	38.84	38.84
2018 - 2045	0	79.67	79.67
2046	0	38.84	38.84

Comments:
Annual water savings benefits to be realized following implementation of the Project were estimated through analysis of historical water meter data generated by Rancho California Water District. To arrive at the 79.67 AFY figure, the actual water demand as measured by irrigation meters for each of the nine sites during the years 2012, 2013 and 2014 were averaged and then summed. Currently, the nine sites have a demand of 79.67 AFY. At two of these sites, Rancho Serrano HOA and La Serena HOA, plant materials conversions from high water use plant materials to drought tolerant plant species will take place, replacing 53,514 square feet of area. According to DWR, turf replacement saves 45 gallons of water per square foot of turf replaced per year (DWR, 2015. Turf Replacement Initiative. Executive Order B-29-15. http://water.ca.gov/waterconditions/docs/Turf%20Replacement%20Initiative.pdf). When applied to the 53,514 square feet of area to be replaced, this equals 2,354,616 gallons per year or 7.39 AFY. The remaining irrigation demand at the nine sites will be served through recycled water. All nine sites will be converted to recycled water irrigation, resulting in 72.28 AFY of recycled water use after the 7.39 AFY of savings from plant conversions is subtracted from the original 79.67 AFY of irrigation demand. In total, implementation of this project will result in an overall reduction in potable water supply by 79.67 AFY.

Benefits will commence following completion of the first site conversion, in 2017, per the Project schedule in Attachment 5, and will ramp down as the Project useful life of each site ends.

Secondary Benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use

The table below provides information regarding the benefit of energy savings and greenhouse gas emissions reductions from reduced imported water use. This benefit will be achieved through the conversion to recycled water and the replacement of turf areas with drought tolerant plants reducing total demand, both of which are expected to reduce imported potable water use.

Table 5 – Annual Project Physical Benefits
Project Name: Expanded Recycled Water & Plant Material Conversion Project
Type of Benefit Claimed: Energy Saved and GHGs Reduced through Reduced Imported Water Use
Units of the Benefit Claimed: Energy: Kilowatt Hours/ year (KWh/yr)
GHG: Pounds CO_2 equivalents/year (CO_2e/yr)
Anticipated Useful Life of Project (years): 30

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project**
2015-2016	0	0	0
2017	0	Energy: 56,008 GHGs: 34,333	Energy: 56,008 GHGs: 34,333
2018 -2045	0	Energy: 112,017 GHGs: 68,666	Energy: 112,017 GHGs: 68,666
2046	0	Energy: 56,008 GHGs: 34,333	Energy: 56,008 GHGs: 34,333

Comments:
RCWD currently receives 36% of its treated water supply from imported water in an average year, which comes from both the State Water Project (SWP) and Colorado River Aqueduct (CRA) (RCWD, 2011. 2010 Urban Water Management Plan (UWMP). Page 3-8.). Based on RCWD's 2010 UWMP (Page 3-4), approximately 75% of its imported water is delivered from the SWP, and 25% from the CRA. Given that 79.67 AFY of water will be recycled and saved through implementation of this project (see primary benefit), the volume of imported water saved can be estimated at 28.68 AFY (36% of 79.67 AFY). This can be further broken down using the percentages of SWP and CRA water received by RCWD, with 21.51 AFY from the SWP and 7.17 from the CRA.

According to DWR Bulletin B-132-10, pumping of SWP water supply to Pearblossom Pump Station, the first point "upstream" from where RCWD receives imported water, results in a cumulative 4,549 kWh/AF. The Colorado River Aqueduct is estimated to require 1,976 kWh/AF according to CPUC Study 1, page 64. Therefore, using recycled water and outdoor water conservation in lieu of imported potable water will result in energy savings calculated as 21.51 AFY x 4,549 kWh/AF + 7.17 AFY x 1,976 kWh/AF =112,017 kWh/yr.

GHG emissions reduced are estimated based on the energy reduced per year multiplied by the total output emission rate of 613.28 lb CO_2e/MWh or 0.613 lb CO_2e/kWh for California (as reported for the CAMX sub-region in the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 9th edition Version 1.0 Year 2010 Summary Tables, Page 1.). Therefore, 112,017 kWh/yr x 0.613 lb CO_2e/kWh = 68,666 lb CO_2e/yr.

Benefits will commence following completion of the first site conversion, in 2017, per the Project schedule in Attachment 5, and will ramp down as the Project useful life of each site ends.

Technical Analysis of Physical Benefits Claimed

Primary Benefit: Water Supply Recycled and Saved

1) Explanation of the Need for the Project, Including Recent and Historical Conditions

Historically, the State of California has struggled to maintain the reliability of its water supply given its rapidly rising population and the natural reoccurrence of drought conditions, which are characterized by unfavorable snowpack in the Sierra Nevada Mountains and below-normal local precipitation. Current drought conditions have been described as the worst in recorded history, and have led Governor Jerry Brown and the State Water Resources Control Board (State Water Board/SWB) to take unprecedented legislative actions aimed at reducing residential water demand, particularly that portion of residential water demand used for satisfying the plant water requirements of outdoor landscaping. To respond to these legislative actions, which have categorized RCWD as one of the State's largest water users in terms of gallons per capita per day (GPCD) consumption and required RCWD to decrease water production for residential use by 36%, and to mitigate declining water supplies in its local aquifer, RCWD is implementing drastic water conservation measures including a variety of public outreach, technical assistance, and rebate programs. The proposed Project will be another component of this integrated effort undertaken by RCWD to meet State mandates requiring reductions in outdoor water consumption and to preserve its local supplies.

2) Estimates of Without Project Conditions

Without this project, RCWD would not achieve 79.67 AFY of potable demand offset through the use of recycled water. Instead, RCWD would be entirely reliant on water use efficiency measures to reduce potable demand. Along with the implementation of public outreach, technical assistance, and rebate programs, RCWD has declared a Stage 4a Water Shortage as per its Water Shortage Contingency Plan (WSCP), which imposes restrictions on water use during times of extreme drought. In addition to imposing water use restrictions, declaration of the Stage 4a modifies the District's Budget Based Tiered Rate Structure to provide strong financial incentives for customers to reduce water use. It is expected that these activities will produce water savings that will help RCWD meet its goals for conservation; however, it is not known what the quantity of savings will be since these programs rely on customer behavioral change for producing water savings. The proposed Project does not rely on customer behavior, and by its nature, is a strategy that can result in guaranteed and predictable water savings.

3) Descriptions of Methods Used to Estimate Physical Benefits

Annual potable water savings benefits to be realized following implementation of the Project were estimated through use of historical water meter data generated by RCWD. To arrive at 79.67 AFY savings, the actual water demand as measured by irrigation meters for each of the nine sites during the years 2012, 2013 and 2014 were averaged and then summed, as shown in the table below. Currently, the nine sites have a demand of 79.67 AFY. At two of these sites, Rancho Serrano HOA and La Serena HOA, plant materials conversions from high water use plant materials to drought tolerant plant species will take place, replacing 53,514 square feet of area. According to DWR, turf replacements saves 45 gallons of water per square foot of turf replaced per year (DWR, 2015. Turf Replacement Initiative. Executive Order B-29-15. http://water.ca.gov/waterconditions/docs/Turf%20Replacement%20Initiative.pdf). When applied to the 53,514 square feet of area to be replaced, this equals 2,354,616 gallons per year or 7.39 AFY. The remaining irrigation demand at the nine sites will be served through recycled water. All nine sites will be converted to recycled water irrigation, resulting in 72.28 AFY of recycled water use after the 7.39 AFY of savings from plant conversions is subtracted from the original 79.67 AFY of irrigation demand. In total, implementation of this project will result in an overall reduction in potable water supply by 79.67 AFY.

Expanded Recycled Water and Plant Material Conversion Project Conversion Sites' Landscape Irrigation Demand

Sites	2012 Demand	2013 Demand	2014 Demand	Average Demand
Temeku Hills Dev S18G & S18H	19.16	17.16	16.46	17.59
Temeku Hills Dev S18A & S18B	11.59	11.97	12.48	12.01
Winchester Creek Dev S02A	3.16	3.05	4.32	3.51
Presley Dev S13D	8.05	3.32	4.24	5.20
Presley Dev S13C	1.67	3.81	3.49	2.99
Crowne Hill Dev S20K	6.15	9.41	9.15	8.24
La Serena HOA	8.87	8.05	8.58	8.50
Rancho Serrano HOA	8.34	7.46	8.78	8.19
Paseo Del Sol HOA	12.43	13.52	14.36	13.44
Total	**79.42**	**77.75**	**81.86**	**79.67**

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

As shown in the Project map, a recycled water distribution system from the Santa Rosa WRF is already in place, and the Project sites are adjacent to the distribution system pipelines. Therefore, the new facilities required to convert each site to use recycled water irrigation include:

- New pipeline laterals from the existing recycled water pipeline that supplies water from the Santa Rosa WRF to each irrigation site
- On-site pipeline retrofits to ensure cross-connections between the recycled water and potable water systems do not occur
- New recycled water meters

Sites where plants will be converted from high water use plant materials to drought tolerant plant species will also require the installation of new drip irrigation systems.

No new policies or administrative actions are required for implementation of the proposed Project as recycled water use for irrigation is already taking place in the area

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them

No adverse impacts will result from implementation of the proposed Project. Converting plant materials at a site represents no risk to the public or the environment, and converting irrigation systems to distribute recycled water is categorically exempt from the requirements of CEQA. Recycled water conversion projects do have the potential to result in cross connection issues; however, these projects are subject to strict design and cross-connection control standards that are enforced by RCWD.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness

The Project will effectively address long-term drought preparedness through the use of recycled water for landscape irrigation. Irrigated areas converted to recycled water use will remain on recycled water and will no longer create a demand for potable water. The off-set potable water can be saved for the community to be used for drinking water purposes. Demonstration gardens using recycled water will increase public awareness of recycled water and continue to encourage recycled water use. Therefore, the Project will effectively address long-term drought preparedness by promoting water conservation and recycling.

Secondary Benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use

1) Explanation of the Need for the Project, Including Recent and Historical Conditions

The State of California has recognized that climate change is already affecting California and is projected to continue to do so well into the foreseeable future (California Energy Management Agency, et al, 2012. California Climate Change Adaptation Planning Guide. Page 3.) Reducing energy and its associated greenhouse gas emissions will help to mitigate climate change. According to the California Energy Commission, about 4% of the energy used in California is used to produce, transport, treat, and distribute water. Generating the energy needed to produce, convey, and distribute water also produces greenhouse gas emissions that contribute to global warming, which itself threatens California's water supply. The State has committed to reducing its emissions by 15% by 2020 under AB-32, the Global Warming Solutions Act of 2006.

Decreasing the amount of energy required to produce water supply is an Objective of the California Water Action Plan, and decreasing the emission of greenhouse gases is a Planning Target of the Upper Santa Margarita Watershed IRWM Plan. The Project will contribute to both goals by reducing the amount of energy used to import water to the region along with the associated emissions.

Reducing the need to import water and rely on local water sources will reduce energy demand especially in the summer months when energy conservation is most needed. Imported water makes up 36% of RCWD's water supply coming from the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) through the SWP and from the Colorado River through the Colorado River Aqueduct (CRA). Reduction in reliance on imported water given that in recent drought years, the supply assurance from these two sources of water have been restricted and it is important for RCWD to build less dependence on imported water and sustain and utilize local supply, including recycled water which is also less of an energy intensive water supply.

2) Estimates of Without Project Conditions

If the Project does not move forward, the sites would remain on potable water, and RCWD would continue to import water, which requires a significant amount of energy estimated at 112,017 kWh/year.

3) Descriptions of Methods Used to Estimate Physical Benefits

As noted above, RCWD currently receives 36% of its water supply from imported water in an average year, which comes from both the SWP and the CRA (reference: RCWD, 2011. 2010 Urban Water Management Plan (UWMP). Page 3-8.). Based on RCWD's 2010 UWMP, approximately 75% of its imported water is delivered from the SWP, and 25% from the CRA. Given that 79.67 AFY of water will be recycled and saved through implementation of this project (see primary benefit), the volume of imported water saved can be estimated at 28.68 AFY (36% of 79.67 AFY). This can be further broken down using the percentages of SWP and CRA water received by RCWD, with 21.51 AFY from the SWP and 7.17 from the CRA.

According to DWR Bulletin B-132-14, page B-20, pumping of SWP water supply to Pearblossom Pump Station, the first point "upstream" from where RCWD receives imported water, results in a cumulative 4,549 kWh/AF. The Colorado River Aqueduct is estimated to require 1,976 kWh/AF according to CPUC Study 1, page 64. Therefore, using recycled water and outdoor water conservation in lieu of imported potable water will result in energy savings calculated as 21.51 AFY x 4,549 kWh/AF + 7.17 AFY x 1,976 kWh/AF =112,017 kWh/yr. No additional energy is required to treat recycled water as all wastewater is currently treated to tertiary standards.

GHG emissions reduced are estimated based on the energy reduced per year multiplied by the total output emission rate of 613.28 lb CO_2e/MWh or 0.613 lb CO_2e/kWh for California (as reported for the CAMX sub-region in the U.S. Environmental Protection Agency Emissions & Generation Resource Integrated Database (eGRID) 9th edition Version 1.0 Year 2010 Summary Tables, Page 1.). Therefore, 112,017 kWh/yr x 0.613 lb CO_2e/kWh = 68,666 lb CO_2e/yr.

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits

To obtain the secondary physical benefits, new facilities will be required to retrofit each irrigation system to be removed from the potable water system as a source and redirected to be supplied by the recycled water system, replace plant material with drought resistant species and replace spray irrigation with drip irrigation, including:

- New piping to change the supply of water from potable to recycled water
- Installation of drip irrigation systems at two sites to replace spray irrigation

No new policies or administrative actions are required for implementation of the proposed Project.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them

No adverse impacts will result from implementation of the proposed Project. Converting plant materials, improving the irrigation system at a site, and converting the sites to recycled water represents no risk to the public or the environment.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness

The Project will effectively address long-term drought through complete removal off potable water, increased use of drought tolerant plants and increased irrigation efficiencies through new drip irrigation systems. Improved irrigation Demonstration Gardens promoting drought-tolerant plants and efficient irrigation systems will help to educate and encourage the community on the drought tolerant plants and drip irrigation. Therefore, the Project will effectively address long-term drought preparedness by promoting water conservation and recycling.

Direct Water-Related Benefit to a DAC

The Project area does not encompass a DAC.

Project Performance Monitoring Plan

The following table describes the Project Performance Monitoring Plan.

Table 6 – Project Performance Monitoring Plan
Project: Expanded Recycled Water & Plant Material Conversion Project

Proposed Physical Benefits	Targets	Measurement Tools and Methods
Primary benefit: Water Supply Recycled and Saved	Reduce potable water demand through irrigation with recycled water by 79.67 Acre-Feet per year	Tools and Methods: Water supply recycled and saved will be measured through reading of recycled water landscape meters at each of the sites to quantify recycled water use. Water supply saved will be estimated by comparing historical water usage to current water usage recycled water conversion sites on an annual basis to verify potable water offset. Locations: Data will be collected at each conversion site. Data to be Collected: Recycled water use for irrigation at each site will be collected. Monitoring data will be used to measure performance by comparing actual water use after recycled water and plant conversions have occurred to historical water use, as well as compared to original estimates for water

Table 6 – Project Performance Monitoring Plan Project: Expanded Recycled Water & Plant Material Conversion Project		
Proposed Physical Benefits	**Targets**	**Measurement Tools and Methods**
		savings to determine actual potable water offset. The monitoring tools and targets are appropriate for the benefits claimed because they will provide a direct measurement of the water supply recycled and saved based on water meters readings on an annual basis.
Secondary benefit: Energy Saved and GHGs Reduced through Reduced Imported Water Use	Reduce energy use by 112,017 kWh/yr and reduce GHG emissions by 92,024 lb/yr	Tools and Methods: Reduced energy use will be measured by reading recycled water usage off of landscape water meters and comparing to historical water use to determine the supply reduction. A 36% factor will be applied to the volume of water saved (calculated as part of the primary benefit) to estimate the volume of imported water reduced through implementation of the Project. Factors will be applied to the imported water reduced to estimate the volume that would have come from the SWP (75%) and from the CRA (25%). To calculate the energy savings, the actual irrigation usage will be multiplied by the estimation of energy usage (kWh) per AF, as provided by DWR's bulletin 132. Locations: Data will be collected at landscape meters at each conversion site and equations used to equate water use to energy saved and GHG emissions reduced. Data to be Collected: Recycled water use at each site will be collected, and calculations will be made to estimate the energy savings. Monitoring data will be used to measure performance by collecting actual water use at the sites, estimating the portion that is imported water (assuming that the current 36% imported water use for RCWD remains valid), estimating the portion that comes from the SWP (currently 75%) and CRA (currently 25%), and applying energy factors of 4,549 kWh/AF for SWP water and 1,976 kWh/AF for CRA water. The monitoring tools and targets are appropriate for the benefits claimed because they provide a conservative, realistic estimate of energy savings provided by the Project, particularly given that physically measuring this type of benefit would be infeasible.

Table 6 – Project Performance Monitoring Plan Project: Expanded Recycled Water & Plant Material Conversion Project		
Proposed Physical Benefits	**Targets**	**Measurement Tools and Methods**

Cost Effectiveness Analysis

Table 7 – Cost Effectiveness Analysis Project Name: Expanded Recycled Water & Plant Material Conversion Project		
Question 1	Types of benefits provided as shown in the Annual Project Physical Benefits Section (above)	• Water supply recycled and saved • Energy saved and GHGs reduced through reduced imported water use
Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?	No.
	If no, why?	While there are other types of projects that could result in water savings, none can completely eliminate the potable water requirement at a landscape irrigation site like a recycled water conversion project
	If yes, list the methods (including the proposed project) and estimated costs.	N/A
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.	N/A
Comments: None		

Riverside County Parks Turf Reduction Program

The Riverside County Parks Turf Reduction Program (Project), which will be undertaken by the Riverside County Regional Park and Open Space District (Park and Open Space District), consists of replacing turfgrass at the Lake Skinner Park Area with drought tolerant plants and retrofitting the existing overhead irrigation system with drip irrigation to improve irrigation efficiency and reduce lost water through water runoff. The areas at Lake Skinner Park where turfgrass will be replaced and irrigation will be retrofitted include: Kiosk Proper (0.4 acres replaced with native plants), Kiosk Triangle (0.09 acres replaced with river rock), Camp Store (0.2 acres replaced with native plants), Campground A (0.6 acres replaced with native trees), Campground B (2 acres replaced with native trees), Campground C (0.7 acres replaced with native trees).

The major physical components of the project include:

- Removal of 3.99 acres (173,804 square feet [sf]) of existing turfgrass areas
- Installation of drought tolerant native plants and trees in place of turfgrass areas
- Installation of permeable ground cover such as wood chips or mulch to allow infiltration of rain water
- Retrofitting of existing irrigation systems with irrigation systems that promote water use efficiency, including root zone watering systems for the native trees to be planted and drip irrigation for the native plants
- Installation of interpretive signage intended to educate park visitors about water conservation

The anticipated primary and secondary physical benefits of the Project are water savings of approximately 5.3 acre-feet per year (AFY), and restoration of 3.9 acres of native habitat (does not include the Kiosk Triangle .09 acres of turf to be replaced with river rock). The drought tolerant plants and improved irrigation efficiency will reduce water demand, while replacement of turfgrass with native plants will provide habitat for native species. Because the benefits of turfgrass removal are virtually permanent, water savings and native habitat restoration are expected to continue in perpetuity.

The intended outcome of the Project is to reduce irrigation demand and dependence on imported water, provide native habitat for a variety of local wildlife, reduce urban runoff of pesticides and fertilizers into local waterways by improving irrigation efficiency, and educate more than 300,000 park visitors annually on the importance of water conservation and drought preparedness. In addition, the Project will help to reduce the energy use and greenhouse gas emissions associated with imported water use by reducing irrigation demands. With current drought conditions at an all-time high, the Park and Open Space District is committed to doing its part to ensure water is used wisely and efficiently.

The Project will address the current needs of the Region by supporting the following objectives of the USMW IRWM Plan: Reduce regional potable water consumption, adapt to and mitigate against climate change by promoting adaptation strategies and reducing water related greenhouse gas emissions, improve recreation opportunities and open space through multiple benefit projects, and reduce controllable pollutant sources to 303(d) listed receiving waters.

Project Map

Figure 2-6, Figure 2-7, Figure 2-8, and Figure 2-9 show the Project areas where turfgrass replacement and efficient irrigation installation will take place. Monitoring locations will occur at each site based on the area of turfgrass replaced and number of irrigation fixtures replaced; therefore, specific locations will be identified at a later time. The Project is not located within a DAC; therefore, there are no DACs shown on the following figures.

Figure 2-6: Riverside County Parks Turf Reduction Program Vicinity Map

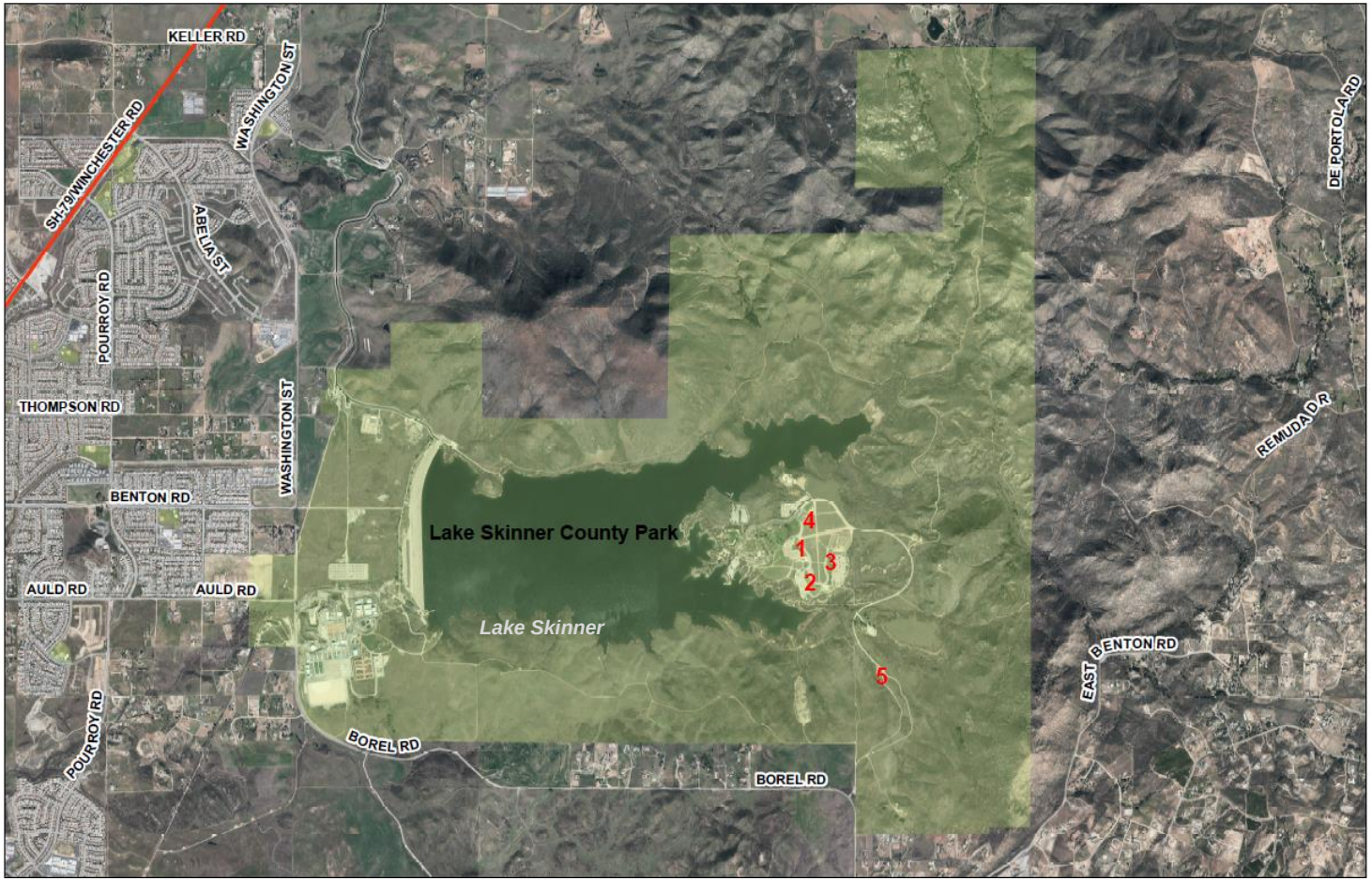


Figure 2-7: Riverside County Parks Turf Reduction Program – Campgrounds A (Area 1), B (Area 2) and C (Area 3)

Figure 2-8: Riverside County Parks Turf Reduction Program – Camp Store (Area 4)

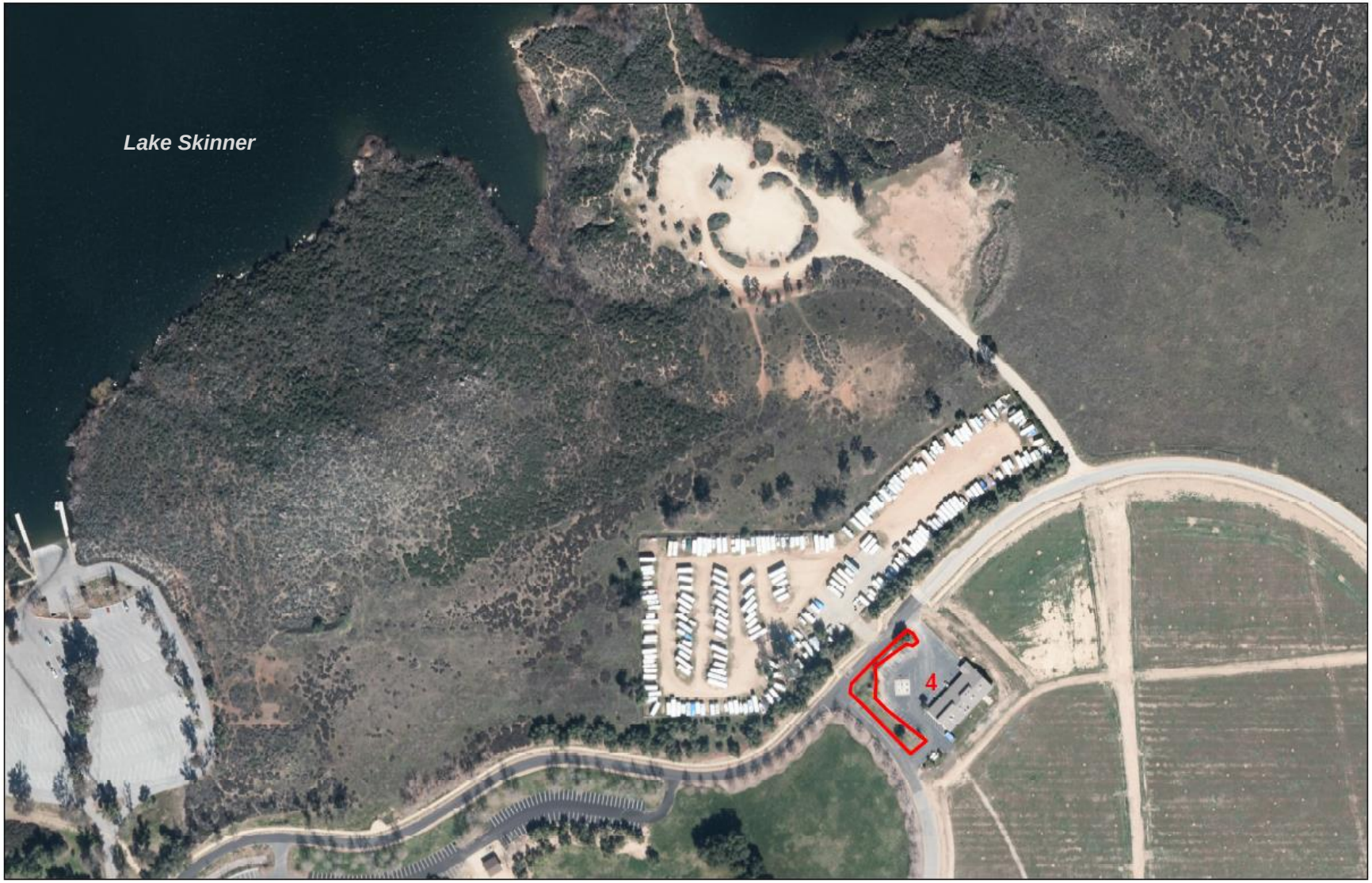


Figure 2-9: Riverside County Parks Turf Reduction Program – Kiosk Triangle and Kiosk Proper Area (Area 5)

Project Physical Benefit

The following physical benefits are claimed for the Project and are listed in the tables below.

- Water Supply Saved
- Habitat Restored

Primary Benefit: Water Supply Saved

The table below provides information on the benefit of water supply saved through reduced irrigation demand. Irrigation will be reduced through replacement of high water using turfgrass with native, drought tolerant trees and plants, as well as replacement of existing sprinkler heads with efficient drip irrigation and root zone watering systems.

Table 5 – Annual Project Physical Benefits
Project Name: Riverside County Parks Turf Reduction Program
Type of Benefit Claimed: Water Supply Saved
Units of the Benefit Claimed: Acre feet per year (AFY)
Anticipated Useful life of Project: 20 years

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project	Change Resulting from Project (c) – (b)
2015-2016	5.7	0.4	0
2017 - 2036	5.7	0.4	5.3

Comments:
Water supply saved was estimated as part of a Park and Open Space District staff report (Riverside County Regional Park and Open Space District, 2015. Current Irrigation and Proposed Drip Irrigation. Page 1) detailing anticipated irrigation run times at each location, days of irrigation per month, minutes per day of irrigation, and gallons per minute used. Currently, irrigation is estimated at 3,758,850 gallons per year or 11.5 AFY. Due to the ongoing drought, it's estimated that turfgrass will be underwatered by 50%, making the without project water supply use 5.7 AFY. With the Project, drip irrigation will be installed and is estimated to use 139,116 gallons per year or 0.4 AFY. Benefits will begin following construction completion in December 2016, as shown in the schedule provided in Attachment 5.

Secondary Benefit: Habitat Restored

The table below provides information regarding the benefit of habitat improved through the replacement of turf with native, drought tolerant plants and trees.

Table 5 – Annual Project Physical Benefits **Project Name: Riverside County Parks Turf Reduction Program** **Type of Benefit Claimed: Habitat restored** **Units of the Benefit Claimed: acres** **Anticipated Useful Life of Project (years): 20 years**			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Difference**
2015 - 2016	0	0	0
2017 - 2036	0	3.9	3.9
Comments: Habitat benefits are based upon actual physical measurements of areas to be restored. Areas where turf will be replaced with native plants and trees include: Kiosk Proper (0.4 acres with native plants), Camp Store (0.2 acres replaced with native plants), Campground A (0.6 acres replaced with native trees), Campground B (2 acres replaced with native trees), and Campground C (0.7 acres replaced with native trees). Benefits will begin following construction completion in December 2016, as shown in the schedule provided in Attachment 5.			

Technical Analysis of Physical Benefits Claimed

Primary Benefit: Water Supply Saved

1) Explanation of the Need for the Project, Including Recent and Historical Conditions

The State of California is currently experiencing one of the most severe droughts on record, which has severely depleted statewide water supplies. The USMW Region has experienced significant cutbacks to imported supply since 2008 as a result of both the current drought and newly instated environmental restrictions limiting SWP supplies from the Bay-Delta. The results of these still recent drought conditions can be seen throughout the Region as an increased implementation of local supply development projects and conservation measures and ordinances. Historically, the Park and Open Space District has maintained expansive turf areas at Lake Skinner Park. While these turf areas do provide recreational value, they require large amounts of irrigation water to maintain. In light of California's current drought conditions and the requirement by the Governor of California to reduce overall water use in California, the Park and Open Space District has decided that it would support this effort by replacing the park's turf areas with drought tolerant native plants, reducing the overall water demand and improving the native habitat of the area.

2) Estimates of Without Project Conditions

If the Project is not implemented, the Lake Skinner Park turfgrass area will continue to be watered, although it will be under watered in light of the ongoing drought at a rate of 5.7 AFY (assuming turf will be under watered by 50%), which will bring browning turf and potential fire danger. This would create an overall negative appeal to the area and a continued waste of water resources.

3) Descriptions of Methods Use to Estimate Physical Benefits

Water saved is estimated based on gallons per minute data for irrigation systems and anticipated run times of turf areas versus native, drought tolerant planting areas, and is based on a Parks and Open Space District staff report (Riverside County Regional Park and Open Space District, 2015. Current Irrigation and Proposed Drip Irrigation. Page 1). This report details current and anticipated irrigation run times at each location based on the number of sprinkler heads, types of sprinkler heads, days of irrigation per month, minutes per day of irrigation, and gallons per minute used. The numbers and assumptions used to calculate current irrigation water use and drip irrigation water use are shown on the next page. It's estimated that current irrigation water use is 3,758,850 gallons per year, while drip irrigation will only use 139,116 gallons per year. As stated above, without the Project, turfgrass is expected to be under watered due to the ongoing drought. For the purposes of these calculations, it's assumed that watering of turfgrass will be cut back by 50%. Therefore, the supply saved benefit is equal to 3,758,850 gallons per year x 50% - 139,116 gallons per year = 1,740,309 gallons per year or 5.3 AFY.

CURRENT IRRIGATION										
MONTH	# DAYS	MP2000 1.47 GPM # of heads	RUN TIME	TOTAL MINUTES	TOTAL GALLON MONTH		PGP 5.20 GPM # of heads	RUN TIME	TOTAL MINUTES	TOTAL GALLON MONTH	COMBINED TOTAL
JAN	0	105	0	0	0		81	0	0	0	
FEB	0	105	0	0	0		81	0	0	0	
MAR	15	105	10	15,750	23,153		81	18	21,870	113,724	
APRIL	30	105	10	31,500	46,305		81	35	85,050	442,260	
MAY	31	105	10	32,550	47,849		81	35	87,885	457,002	
JUNE	30	105	10	31,500	46,305		81	35	85,050	442,260	
JULY	31	105	10	32,550	47,849		81	35	87,885	457,002	
AUG	31	105	10	32,550	47,849		81	35	87,885	457,002	
SEPT	30	105	10	31,500	46,305		81	35	85,050	442,260	
OCT	31	105	10	32,550	47,849		81	35	87,885	457,002	
NOV	15	105	10	15,750	23,153		81	18	21,870	113,724	
DEC	0	105	0	0	0		0	0	0	0	
				Gallons per Year	376,614				Gallons per Year	3,382,236	3,758,850

PROPOSED DRIP IRRIGATION										
MONTH	# DAYS	RZWS-18-25-CV .25 GPM # of heads	RUN TIME	TOTAL MINUTES	TOTAL GALLON MONTH		PLD-10 0.017 GPM # of heads	RUN TIME	TOTAL MINUTES	TOTAL GALLON MONTH	COMBINED TOTAL
JAN	0	140	0	0	0		100	0	0	0	
FEB	0	140	0	0	0		100	0	0	0	
MAR	15	140	15	31,500	7,875		100	30	3,000	51	
APRIL	30	140	15	63,000	15,750		100	30	90,000	1,530	
MAY	31	140	15	65,100	16,275		100	30	93,000	1,581	
JUNE	30	140	15	63,000	15,750		100	30	90,000	1,530	
JULY	31	140	15	65,100	16,275		100	30	93,000	1,581	
AUG	31	140	15	65,100	16,275		100	30	93,000	1,581	
SEPT	30	140	15	63,000	15,750		100	30	90,000	1,530	
OCT	31	140	15	65,100	16,275		100	30	93,000	1,581	
NOV	15	140	15	31,500	7,875		100	30	3,000	51	
DEC	0	140	0	0	0		100	0	0	0	
				Gallons per Year	128,100				Gallons per Year	11,016	139,116

Current Water Use	3,758,850 gallons per year
Proposed Water Use	139,116 gallons per year
Water Savings	3,619,734 gallons per year, or approximately 11.11 acre feet

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits
New facilities required to obtain the physical benefits for the Project include newly retrofitted irrigation systems that include drip irrigation and micro sprays capable of delivering water accurately to the plant, reducing runoff, overspray and overwatering. No new policies or actions will be required to achieve the Project benefits.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them
Potential adverse impacts of removing turf include increased dust, loss of the cooling effects of grass, and increased vulnerability of the area to invasive species or weeds. The Park and Open Space District intends to mitigate those impacts by installing permeable groundcover, such as wood chips, to reduce dust and invasive species, and planting native trees to provide shade.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness
Replacement of turf with drought tolerant plants will be a permanent change providing indefinite reduced water demand for the Park and Open Space District. Therefore, the Project contributes to sustainable water supply and reliability during water shortages by promoting water conservation, and improving landscape irrigation efficiencies, thereby addressing long-term drought preparedness.

Secondary Physical Benefit: Habitat Restored

1) Explanation of the Need for the Project, Including Recent and Historical Conditions
The region in which Lake Skinner is located has historically consisted of several different types of native California habitat, including coastal sage scrub, willow riparian and oak woodlands, and native grassland. Many plant and animal species call these habitats home, including more than 16 listed as sensitive, threatened or endangered species. Some examples include the Los Angeles Pocket Mouse. Stephen's Kangaroo Rat, and Burrowing Owl.

The areas identified for restoration as a part of the Project are currently landscaped with turfgrass. Turfgrass provides little to no habitat for native flora and fauna. By removing the turfgrass and replacing it with native, drought tolerant plants and trees, the Park and Open Space District will be providing potential habitat for sensitive, threatened, and endangered species.

2) Estimates of Without Project Conditions
If the Project does not move forward, the current situation will stay the same, where 3.7 acres of turf will remain in place and no additional habitat will be created.

3) Descriptions of Methods Use to Estimate Physical Benefits
The physical benefit of habitat restored equate to 3.9 acres. Areas that will replace turf with native plants and trees include:

- Kiosk Proper – 0.4 acres replaced with native plants
- Camp Store – 0.2 acres replaced with native plants
- Campground A – 0.6 replaced with native trees
- Campground B – 2 acres replaced with native trees
- Campground C – 0.7 acres replaced with native trees

Areas were calculated based on aerial photos showing turfgrass areas in the above listed locations. The Kiosk Triangle with an area of .09 acres of turf replaced with river rock is not included in habitat restored.

4) Identification of All New Facilities, Policies, and Actions Required to Obtain the Physical Benefits
New facilities required to obtain the physical benefits for the Project include newly retrofitted irrigation systems that include drip irrigation and micro sprays capable of delivering water accurately to the plant, reducing runoff, overspray and overwatering. No new policies or actions will be required to achieve the Project benefits.

5) Description of Any Potential Adverse Physical Effects and What is Being Done to Mitigate Them
Potential adverse impacts of removing turf include increased dust, loss of the cooling effects of grass, and increased vulnerability of the area to invasive species or weeds. The Park and Open Space District intends to mitigate those impacts by installing permeable groundcover, such as wood chips, to reduce dust and invasive species, and planting native trees to provide shade.

6) Description of Whether the Project Addresses Long-Term Drought Preparedness
Replacement of turf with drought tolerant plants will be a permanent change providing indefinite reduced water demand for the Park and Open Space District. Therefore, the Project contributes to sustainable water supply and reliability during water shortages by promoting water conservation, and improving landscape irrigation efficiencies.

Direct Water-Related Benefit to a DAC

The Project area does not encompass a DAC.

Project Performance Monitoring Plan

The following table describes the Project Performance Monitoring Plan.

Table 6 – Project Performance Monitoring Plan Project: Riverside County Parks Turf Reduction Program		
Proposed Physical Benefits	**Targets**	**Measurement Tools and Methods**
Primary benefit: Water Supply Saved	Save approximately 5.3 AFY of water supply.	Tools and Methods: Calculations based on gallons per minutes output and actual run-times of irrigation systems as compared to pre-project irrigation. This will be applied to irrigation system specifications that detail the rate of water used. Locations: Turf replacement locations. Data to be Collected: Run-times of irrigation systems and irrigation system specifications. Monitoring data will be used to measure performance by

Table 6 – Project Performance Monitoring Plan Project: Riverside County Parks Turf Reduction Program		
Proposed Physical Benefits	**Targets**	**Measurement Tools and Methods**
		estimating the gallons per minute of irrigation system output, and comparing to the estimated pre-project irrigation. The monitoring tools and targets are appropriate for the benefits claimed because they will provide an accurate estimate of the water saved through turf replacement based on actual turf replacement.
Secondary benefit: Habitat Restored	Restore 3.9 acres of native habitat.	Tools and Methods: Measurement of actual area of native habitat restored. Locations: General project area. Data to be Collected: Acres of native habitat restored. Monitoring data will be used to measure performance by directly measuring the acres of habitat restored. The monitoring tools and targets are appropriate for the benefits claimed because they will provide a direct measurement of the acres of habitat restored,

Cost Effectiveness Analysis

Table 7 – Cost Effectiveness Analysis Project Name: Riverside County Parks Turf Reduction Program		
Question 1	Types of benefits provided as shown in the Annual Project Physical Benefits Section (above)	• Water Supply Saved • Habitat Restored

Question 2	Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?	Yes
	If no, why?	Not applicable
	If yes, list the methods (including the proposed project) and estimated costs.	• Lake Skinner Turf Reduction Alternative (proposed project) • Lake Skinner Turf Eradication Alternative ($0) – Alternative would eliminate watering of turf, but would not replace with other plants to provide native habitat benefit.
Question 3	If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.	The Parks and Open Space District proposed Project is not the least cost alternative, but it is the preferred alternative due to additional benefits. The Project will provide additional benefits to water supply saved by addressing the adverse impacts of turf removal (increased dust, invasive species, and lack of cooling effect), restoring native habitat, and improving the recreational value of the park.
Comments: None		